

REMARKS

I. Introduction

Claim 11 is canceled without prejudice, claim 23 is added, claims 12 to 14, 19, and 20 were previously withdrawn due to a restriction requirement, and therefore claims 10, 15 to 18, 21, and 23 are pending and being considered in the present application. In view of the following remarks, it is respectfully submitted that claims 10, 15 to 18, 21, and 23 are allowable, and reconsideration is respectfully requested.

Applicants note with appreciation the acknowledgment of the claim for foreign priority and the indication that all certified copies of the priority documents have been received.

Applicants thank the Examiner for considering the previously filed Information Disclosure Statement, PTO 1449 paper and cited references.

II. Notice Of Non-Responsive Amendment

The Examiner asserts on page 2 of the Notice of Non-Responsive Amendment that figures 3-4 have a measuring chamber 23 as evidenced by the fact that the specification states “the absence of a measuring chamber or cavity permits the gas inlet bore hole to be omitted” and figures 3-5 show an inlet bore hole 24. Applicants respectfully disagree. “Permitting” an element is entirely different than “requiring” that element. In the present application, while the absence of a measuring chamber or cavity may permit the gas inlet bore to be omitted, it does not follow that if a gas inlet bore is present (which Applicants do not necessarily concede is the case), then a measuring chamber must be present. If “A” then “B,” does not mean that if “B” then “A.” In the present application, element 23 is a clearance between the diffusion layers and second solid electrolyte layer 213. While the clearance may be filled with a gas mixture via a gas supply orifice 24, that does not necessarily make it a “measuring” chamber.

III. Rejection of Claims 10, 11, 15 to 18, 21, and 22 under 35 U.S.C. § 112, ¶ 2

Claims 10, 11, 15 to 18, 21, and 22 were rejected under 35 U.S.C. § 112, ¶ 2 as being indefinite. In particular, the Office Action asserts that it is unclear how the gas sensor operates in a concentration cell with two reference electrodes and that the originally filed specification does not explicitly disclose a concentration cell having two reference electrodes.

(See *Office Action*, page 3, section 5.) Applicants respectfully submit that the rejection should be withdrawn for at least the following reasons.

It is respectfully submitted that if upon review of a claim in its entirety, the Office concludes that a rejection under 35 U.S.C. 112, ¶ 2 is appropriate, an analysis as to why the phrase(s) used in the claim are “vague and indefinite” should be included in the Office action. *M.P.E.P.* § 2173.02. The Office has not included any such analysis. Instead, the Office Action asserts that “it is unclear how the gas sensor would operate in a concentration cell with two reference electrodes,” which is completely unrelated to whether the phrases or terms of the claim are vague and indefinite. In this regard, it is further noted that the claims recite the invention. Their purpose is not to explain how the invention works. That role is left to the specification. *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1558 (Fed. Cir. 1983). Since claim 10 is clear and gives rise to no ambiguity, it therefore satisfies the requirements of 112, ¶ 2.

Notwithstanding the above, the specification of the present application clearly describes how to practice the subject matter of claim 10:

First electrode 12 situated on solid electrolyte sheet 111 (lower solid electrolyte sheet in Figure 1) is coated by a **coarsely porous** diffusion layer 18, while **second electrode 13** situated on solid electrolyte sheet 112 (upper solid electrolyte sheet in Figure 1) is coated by a **finely porous** diffusion layer 19 ... One of the two electrodes 12, 13 is optionally connected to **reference electrode 17** as a reference electrode and forms with it a **concentration cell or Nernst cell**. (*Specification*, page 5, lines 13 to 19; and lines 25 to 27, emphasis added.)

The specification further provides the following:

The sensor element also has a **reference electrode** which is situated on the solid electrolyte and is exposed to a **reference gas**. **One of the two electrodes, with a reference electrode and the solid electrolyte, forms a concentration cell or a Nernst cell**. To make the measured values produced by the sensor element insensitive to pressure fluctuations in the gas mixture, the electrode surface of the second electrode facing away from the solid electrolyte is coated with a **finely porous diffusion layer**, which is directly exposed to the gas mixture, and the **second electrode is used as the reference electrode of the Nernst cell**. It is also provided that the porous protective layer may be configured as a coarsely porous diffusion layer, and either of the two electrodes may be used as a **reference**

electrode of the Nernst cell. (*Specification*, Abstract,
emphasis added.)

Accordingly, the specification provides that there is a **first electrode** with a coarsely porous diffusion layer and a **second electrode** with a finely porous diffusion layer. One of these electrodes is connected to a reference electrode (17), thereby forming a **Nernst cell**. The specification further provides that the second electrode (i.e., the electrode from the first and second electrodes that is not used to make the Nernst cell) is used as a **reference electrode of the Nernst cell**.

Accordingly, the Specification – as read by a person having ordinary skill in the art – provide a plain understanding of how to practice the subject matter of claim 10 without undue experimentation. Indeed, it is difficult to imagine how more definite the claim language could be in view of the extensive and specific support and examples provided in the specification.

In view of the foregoing, it is respectfully submitted that the presently pending claims comply with the second paragraph of § 112 *since a person having ordinary skill in the art would understand what is claimed when the claim is read in view of the specification*. See *Miles Labs., Inc. v. Shandon, Inc.*, 997 F.2d 870, 27 U.S.P.Q.2d 123 (Fed. Cir. 1993). Accordingly, claim 10 is allowable, as are its dependent claims 11, 15 to 18, 21 and 22.

Withdrawal of the indefiniteness rejection is therefore respectfully requested.

IV. Rejection of Claims 10, 11, and 15 under 35 U.S.C. § 102(b)

Claims 10, 11, and 15 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Publication No. 2004/0040846 to Heimann et al., (“Heimann”). Applicants respectfully submit that the rejection should be withdrawn for at least the following reasons.

While the rejections may not be agreed with, to facilitate matters, claim 11 has been canceled herein without prejudice and its features included in independent claim 10, thereby rendering moot the rejection of claim 11.

Claim 10 pertains to a sensor element for a gas sensor for determining a concentration of a gas component in a gas mixture. As presented, it includes, in relevant part, the following features:

a **reference electrode** provided on the solid electrolyte and exposed to a reference gas;

a **porous protective layer for the first electrode**, wherein the first electrode is exposed to the gas mixture via the porous protective layer,

wherein the **first electrode forms, together with the reference electrode and the solid electrolyte, a concentration cell**, and

wherein the porous protective layer is a **coarsely porous diffusion layer**; and

a **finely porous diffusion** layer coated on a surface of the **second electrode** facing away from the solid electrolyte,

wherein the finely porous diffusion layer is directly exposed to the gas mixture, and

wherein the **second electrode is configured as a reference electrode of the concentration cell**.

It is respectfully submitted that the Heimann reference does not identically disclose or suggest the above identified features. For example, claim 10 provides for a first electrode and a second electrode to be exposed to the same gas mixture via their protective layers. In stark contrast, electrodes 33 and 31 of Heimann (cited by the Office Action as representing the first and second electrodes of claim 10) are not exposed to the same gas mixture via the porous protective layer. Instead, electrode 31 of Heimann is exposed to a measurement gas space 41 and enclosed by solid electrolyte 22. (*See Heimann*, paragraph [0019] and Fig. 1.) Claim 1 is allowable for at least this reason.

Further, claim 10, as presented, provides for a **first electrode** with a **coarsely porous** diffusion layer and a **second electrode** with a **finely porous** diffusion layer. Any review of the Heimann reference makes plain that this feature is not identically disclosed or suggested. Claim 1 is allowable for this additional reason.

Still further, claim 10, as presented, provides for the second electrode to be configured as a **reference electrode of the concentration cell**. The Office Action conclusorily asserts that “the second electrode 31 is capable of functioning as the reference electrode of the concentration cell.” (*Office Action*, page 4.) To the extent that the Office Action may be relying on the inherency doctrine, it is respectfully submitted that to rely on inherency, the Office must provide a “basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristics *necessarily* flows from the teachings of the applied art.” (*See* M.P.E.P. § 2112; emphasis in original; and *see Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Int’f. 1990)). Thus, the M.P.E.P. and the case law

make clear that simply because a certain result or characteristic may occur in the prior art does not establish the inherency of that result or characteristic. Accordingly, it is respectfully submitted that any anticipation rejection premised on the inherency doctrine is not sustainable absent the foregoing conditions.

Further, as discussed above, electrode 31 of Heimann is not exposed to the same gas mixture as electrode 33; instead it is in a separate measurement gas space 41. Accordingly, electrode 31 is not configured as a reference electrode, let alone *of the concentration cell*, as provided in the context of the claimed subject matter.

Still further, claim 10, has been amended to include the feature in which ***the sensor element does not include a measuring chamber***. (Support for this feature can be found, for example, on page 2, lines 11 to 13 of the specification.) In this regard, Heimann specifically discloses that it includes a “measurement gas space 41.” (*See Heimann*, paragraph [0019].) Accordingly, Heimann does not identically disclose or suggest all the features of claim 10, as presented. Claim 10 is allowable for this additional reason.

In view of the foregoing, claim 10 is allowable, as is its dependent claim 15.

Withdrawal of the anticipation rejections of claims 10 and 15 is therefore respectfully requested.

V. Rejection of Claims 16 and 17 under 35 U.S.C. § 103(a)

Claims 16 and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Heimann in view of U.S. Patent No. 4,808,293 to Fukuda et al., (“Fukuda”). Applicants respectfully submit that the rejection should be withdrawn for at least the following reasons.

Claims 16 and 17 ultimately depend from claim 10 and they are therefore allowable for essentially the same reasons, since the secondary Fukuda references do not cure – and is not asserted to cure – the critical deficiencies of the Heimann reference, as discussed above.

Withdrawal of the obviousness rejections of claims 16 and 17 is therefore respectfully requested.

VI. Rejection of Claims 10, 11 and 15 under 35 U.S.C. § 103(a)

Claims 10, 11, and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,579,643 to Mase et al., (“Mase”) in view of U.S. Patent No. 4,902,400 to Usami et al., (“Usami”). Applicants respectfully submit that the rejection should be withdrawn for at least the following reasons.

As noted above, claim 11 has been canceled without prejudice and its features included in independent claim 10, thereby rendering moot the rejection of claim 11.

As to independent claim 10, as presented, it requires that the sensor element not include a *measuring chamber*. Applicant’s have recognized that this makes possible to avoid measuring errors due to pressure fluctuations in the gas mixture (*See Specification*, page 2, lines 11 to 29.)

In stark contrast, Mase relies on measuring chambers for its measurement. Indeed, it specifically discloses that “[t]he device has a **measurement-gas space** ..., and a reference-gas space into which a reference gas is introduced.” (*Mase*, Abstract, emphasis added.) Accordingly, unlike the claimed subject matter, Mase uses measuring chambers for its measurements. The secondary Usami reference does not cure – and is not asserted to cure – this critical deficiency.

Furthermore, the Office will note that claim 10 has been amended herein without prejudice to recite that the *second electrode is configured as a reference electrode of the concentration cell*. As indicated in *In re Venezia*, 530 F.2d 956 (C.C.P.A. 1976), the phrases like “adapted to” (or configured) do not merely set forth an intended use, but rather set forth a “**present structures or attributes**.”

Claims 10, 11, and 15 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Publication No. 2004/0040846 to Heimann et al., (“Heimann”). Applicants respectfully submit that the rejection should be withdrawn for at least the following reasons.

While the rejections may not be agreed with, to facilitate matters, claim 11 has been canceled herein without prejudice and its features included in independent claim 10, thereby rendering moot the rejection of claim 11.

Claim 10 pertains to a sensor element for a gas sensor for determining a concentration of a gas component in a gas mixture. As presented, it includes, in relevant part, the following features:

a **reference electrode** provided on the solid electrolyte and exposed to a reference gas;
a **porous protective layer for the first electrode**,
wherein the first electrode is exposed to the gas mixture via the porous protective layer,
wherein the **first electrode forms, together with the reference electrode and the solid electrolyte, a concentration cell**, and
wherein the porous protective layer is a **coarsely porous diffusion layer**; and
a **finely porous diffusion** layer coated on a surface of the **second electrode** facing away from the solid electrolyte,
wherein the finely porous diffusion layer is directly exposed to the gas mixture, and
wherein the **second electrode is configured as a reference electrode of the concentration cell**.

It is respectfully submitted that the Heimann reference does not identically disclose or suggest the above identified features. For example, claim 10 provides for a first electrode and a second electrode to be exposed to the same gas mixture via their protective layers. In stark contrast, electrodes 33 and 31 of Heimann (cited by the Office Action as representing the first and second electrodes of claim 10) are not exposed to the same gas mixture via the porous protective layer. Instead, electrode 31 of Heimann is exposed to a measurement gas space 41 and enclosed by solid electrolyte 22. (*See Heimann*, paragraph [0019] and Fig. 1.) Claim 1 is allowable for at least this reason.

Further, claim 10, as presented, provides for a **first electrode** with a **coarsely porous** diffusion layer and a **second electrode** with a **finely porous** diffusion layer. Any review of the Heimann reference makes plain that this feature is not identically disclosed or suggested. Claim 1 is allowable for this additional reason.

Still further, claim 10, as presented, provides for the second electrode to be configured as a **reference electrode of the concentration cell**. The Office Action conclusorily asserts that “the second electrode 31 is capable of functioning as the reference electrode of the concentration cell.” (*Office Action*, page 4.) To the extent that the Office Action may be relying on the inherency doctrine, it is respectfully submitted that to rely on inherency, the

Office must provide a “basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristics *necessarily* flows from the teachings of the applied art.” (See M.P.E.P. § 2112; emphasis in original; and see *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Int’f. 1990)). Thus, the M.P.E.P. and the case law make clear that simply because a certain result or characteristic may occur in the prior art does not establish the inherency of that result or characteristic. Accordingly, it is respectfully submitted that any anticipation rejection premised on the inherency doctrine is not sustainable absent the foregoing conditions.

Further, as discussed above, electrode 31 of Heimann is not exposed to the same gas mixture as electrode 33; instead it is in a separate measurement gas space 41. Accordingly, electrode 31 is not configured as a reference electrode, let alone *of the concentration cell*, as provided in the context of the claimed subject matter.

Still further, claim 10, has been amended to include the feature in which ***the sensor element does not include a measuring chamber***. (Support for this feature can be found, for example, on page 2, lines 11 to 13 of the specification.) In this regard, Heimann specifically discloses that it includes a “measurement gas space 41.” (See *Heimann*, paragraph [0019].) Accordingly, Heimann does not identically disclose or suggest all the features of claim 10, as presented. Claim 10 is allowable for this additional reason.

In view of the foregoing, claim 10 is allowable, as is its dependent claim 15.

Withdrawal of the anticipation rejections of claims 10 and 15 is therefore respectfully requested.

In view of the foregoing, the Mase reference by itself or in combination with the Usami reference, does not disclose or suggest all the features of claim 10, as presented. Claim 10, as well as its dependent claim 15, are therefore allowable.

Withdrawal of the obviousness rejections of claims 10 and 15 is therefore respectfully requested.

VII. Rejection of Claims 18 and 21 under 35 U.S.C. § 103(a)

Claims 18 and 21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mase in view of Usami and further in view of U.S. Patent No. 4,755,274 to Mase et al.,

(“Mase II”). Applicants respectfully submit that the rejection should be withdrawn for at least the following reasons.

Claims 18 and 21 ultimately depend from claim 10 and they are therefore allowable for essentially the same reasons, since the secondary Mase II reference does not cure – and is not asserted to cure – the critical deficiencies of the Mase and Usami references, as discussed above.

Withdrawal of the obviousness rejections of claims 18 and 21 is therefore respectfully requested.

VIII. Rejection of Claims 16 and 17 under 35 U.S.C. § 103(a)

Claims 16 and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mase in view of Usami and further in view of Fukuda. Applicants respectfully submit that the rejection should be withdrawn for at least the following reasons.

Claims 16 and 17 ultimately depend from claim 10 and they are therefore allowable for essentially the same reasons, since the secondary Fukuda reference does not cure – and is not asserted to cure – the critical deficiencies of the Mase and Usami references, as discussed above.

Withdrawal of the obviousness rejections of claims 16 and 17 is therefore respectfully requested.

IX. Rejection of Claim 22 under 35 U.S.C. § 103(a)

Claim 22 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Mase in view of Usami in view of Fukuda and further in view of Mase II. Applicants respectfully submit that the rejection should be withdrawn for at least the following reasons.

Claim 22 ultimately depends from claim 10 and it is therefore allowable for essentially the same reasons, since the secondary Fukuda and Mase II references do not cure – and are not asserted to cure – the critical deficiencies of the Mase and Usami references, as discussed above.

Withdrawal of the obviousness rejection of claim 22 is therefore respectfully requested.

X. New Claim 23

New claim 23 has been added herein. It is respectfully submitted that new claim 23 adds no new matter and is fully supported by the present application, including the Specification. New independent claim 23 provides the feature of a first electrode with a coarsely porous diffusion layer and a second electrode with a finely porous diffusion layer. Nowhere, do Mase or Usami disclose that the first electrode is coarsely porous and the second electrode is finely porous. Accordingly, it is respectfully submitted that new independent claim 23, is patentable over the reference relied upon for at least the reasons more fully set forth above.

CONCLUSION

In view of the foregoing, it is respectfully submitted that all of the pending and considered claims are allowable. It is therefore respectfully requested that the rejections and objections be withdrawn. Prompt reconsideration and allowance of the present application are therefore respectfully requested.

Respectfully submitted,

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